

REMARKS

Claims 1, 2, 6-8, 12-14 and 16 are now presented for examination of which Claims 1, 6, 8, 12 and 14 are in independent form. Claims 1, 6, 8, 12, and 14 have been amended to define still more clearly what Applicant regards as his invention. Favorable reconsideration is respectfully requested.

In the outstanding Office Action, Claims 1, 2, 6, 7, 8, 12-14 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,151,457 (*Kawamoto*) in combination with U.S. Patent 4,413,275 (*Horiuchi et al.*)

As previously described, according to an example aspect of the invention to which independent Claim 1 relates, it can be useful to store image data in a memory of a printing apparatus which prints color images, and to do so at a ratio based on the code amount of the encoded data for each color component of the image actually to be printed. The printing apparatus is permitted to print only when all color components for a given pixel exist. Consequently, for example, due to constraints on memory capacity, it was conventionally possible to store in the printing apparatus memory the entire encoded data of the Y and M components of the image to be printed, but if only a certain amount of the remaining C color component could be stored, it was necessary to carry out print processing by using those pixel data for which all color components can be decoded and printed at that time.

According to the example aspect of the invention, on the other hand, when encoding image data to be printed, the information processing apparatus requests the ratio of encoded data amount, notifies a printing apparatus of the requested ratio, and causes

memory area storing each color component data according to that ratio to be secured. As a result, in the printing apparatus, each color component encoded data is stored in a memory area the size of which is based on the encoding ratio for that color component. Also, the number of pixels for which all color components *are* present becomes much larger than before.

Independent Claim 1, as amended, recites as follows:

1. A printing system including an information processing apparatus which outputs print data and a printing apparatus which receives the print data from said information processing apparatus and prints a color image on a sheet,
wherein said information processing apparatus comprises:
storage means for storing a plurality of tables for defining a set of dither matrix patterns used for character/line image and halftone image for each color component;
designation means for designating a table among the plurality of tables;
generation means for generating image data for respective printing color components of an image based on data to be print-outputted delivered from higher processing and quantizing the generated image data for respective printing color components using dither matrixes specified by the table designated by said designation means;
coding means for compress-encoding the quantized image data for the respective printing color components generated by said generation means;
notification means for predicting coded data amounts for the respective printing color components based on the table designated by said designation means and the sizes of halftone image areas and character/line image areas included in the respective printing color components, generating memory allocation ratio information based on a ratio of the predicted coded data amounts for the respective printing color components coded by said coding means and notifying said printing apparatus of the memory allocation ratio information so that said printing apparatus allocates memory areas for respective color components; and
output means for, after said notification means notifies said printing apparatus of the memory allocation ratio information, outputting the coded image data of the respective printing color components coded by said coding means to said printing apparatus,
and wherein said printing apparatus comprises:
a reception buffer;

memory allocation means for receiving the memory allocation information notified by said notification means and allocating, in accordance with the received memory allocation ratio information, memory areas for respective color components in the reception buffer so that the memory sizes of each memory areas correspond to ratios of the predicted coded data amounts for the respective printing color components;

receiving means for, after said memory allocation means allocates memory areas, receiving coded image data for respective color components and storing the received coded image data of respective color components into respective allocated memory areas;

plural decoding means, independently provided for the respective printing color components, for decoding coded data stored in the memory areas to image data; and

printing means for printing the image data for respective color components decoded by said plural decoding means on a sheet.

Among other notable features of the apparatus of Claim 1 are the notification means.

As pointed out previously, *Kawamoto* relates to a system in which (see Fig. 4) image data from an image processing unit 50 is stored in a 4-line FIFO 54-1, encoded by an encoding unit 54-2, and stored in memory 54-4. In addition, image data stored in memory 54-4 is decoded, by means of a decoding unit 54-5.

Applicant submits, however, that nothing in *Kawamoto* would teach or suggest the notification means of Claim 1. Nothing in the *Kawamoto* system is seen to suggest “predicting coded data amounts for the respective printing color components based on [a] table designated by [] designation means and the sizes of halftone image areas and character/line image areas included in the respective printing color components”, as recited in Claim 1. This fact is conceded at page 8 of the Office Action.

Moreover, although the Office Action states that the generating of memory allocation information as recited in Claim 1 is taught at col. 7, lines 21-34 of *Kawamoto*,

that part of *Kawamoto* refers merely to providing filtered digital image date to a FIFO of a memory unit 54, storing the data to form a 4x4 pixel matrix, encoding each matrix and providing encoded data to a memory 54-4, and providing the stored data to a hard disc unit 58. The Office Action has failed to explain which specific part of that subject matter the Examiner believes teaches or suggests generating memory allocation ratio information based on a *ratio of predicted coded data amounts for respective printing color components*, let alone notifying a printing apparatus of that ratio information so that the apparatus allocates memory areas for the color components. Indeed, nothing in *Kawamoto* would teach or suggest those features. For these reasons, Applicant believes that Claim 1 is clearly allowable over *Kawamoto*.

Pages 4-5 of the Office Action allege that:

“Horiuchi ‘275 discloses notification means for predicting coded data amounts for the respective printing color components based on the table designated by said designation means and the sizes of halftone image areas and character/line image areas included in the image to be printed (“*In the case of printing color images having half-tones and hues such as color photographs, it is necessary to be able to reproduce picture images with half-tones and hues closely similar to the original in at least sixteen steps of gradations. A drop-on-demand type of ink-jet head, whereby ink dots can be varied in size in accordance with voltages applied, is suitably used in general and is well known in this art. In this type of ink-jet head, ink drops are practically limited from 100 to 180.mu. in size so that images with half-tones in sufficient steps of gradation are hardly obtainable. To avoid the problem described above, it has been proposed to vary the number of ink dots appearing on a dot matrix having n possible positions in the row and m possible position in the column (n and m being integers) for one picture element so as to reproduce images with half-tones in a sufficiently large number of steps of gradation.*” column 1, lines 41-57).

However, again, the Office Action has failed to explain which particular subject matter of the above quoted portion of *Horiuchi et al.* the Examiner apparently believes teaches *predicting coded data amounts for printing color components based on a designated table and sizes of halftone image areas and character/line image areas included in an image to be printed*. Indeed, nothing in *Horiuchi et al.* would teach or suggest those features, let alone generating memory allocation ratio information based on a ratio of predicted coded data amounts, as set forth in Claim 1.

Therefore, Applicant believes that Claim 1 is allowable over those two patents, taken separately or in any proper combination (if any). If the Examiner disagrees, he is respectfully requested to point out which specific subject matter of *Kawamoto* and *Horiuchi et al.* he believes teaches the above-italicized features of Claim 1, and also to explain specifically how that subject matter could be combined in an attempt to achieve those features.

Independent Claims 6, 8 and 12 each contain recitations that are similar in many relevant respects to those of Claim 1 emphasized above, and are each believed to be patentable for at least the same reasons as discussed above in connection with Claim 1. In addition, independent Claim 14 is a method claim corresponding to system Claim 1, and is believed to be allowable for those same reasons.

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and allowance of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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